

Bulk System Interconnection Standards for Solar Generation

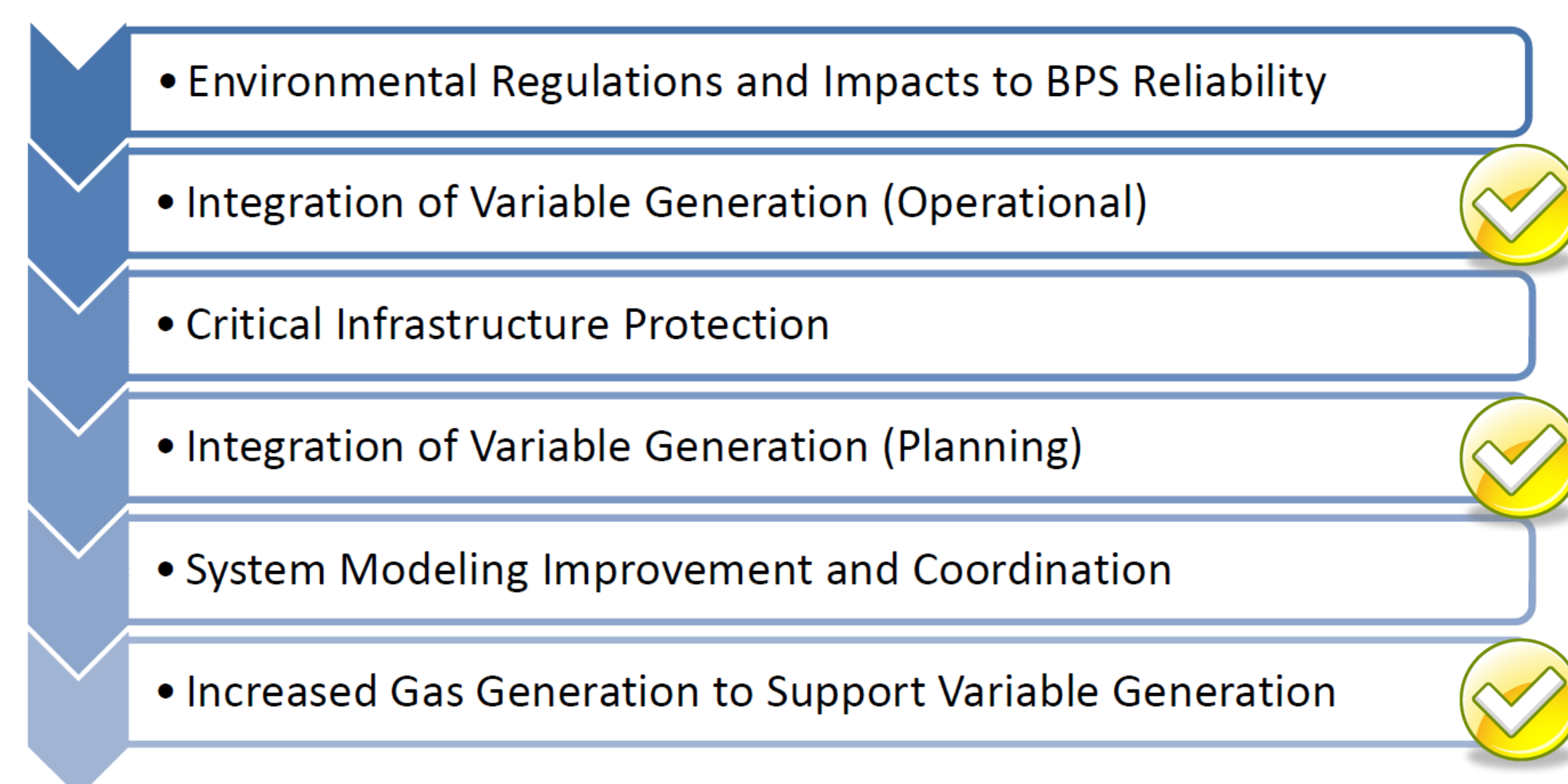
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SYSTEMS INTEGRATION

SOLAR GENERATION AND RELIABILITY

Existing transmission reliability and performance standards, also called “Grid Codes” do not adequately cover solar and other variable generation. In response to this gap, the North America Electric Reliability Corporation (NERC) formed the Integration of Variable Generation Task Force (IVGTF) to recommend updates to bulk system reliability standards.



Variable generation is prominent among NERC's Emerging Reliability Issues (From 2011 NERC Long Term Reliability Assessment report)

Clear, fair and technically reasonable standards for solar generation will:

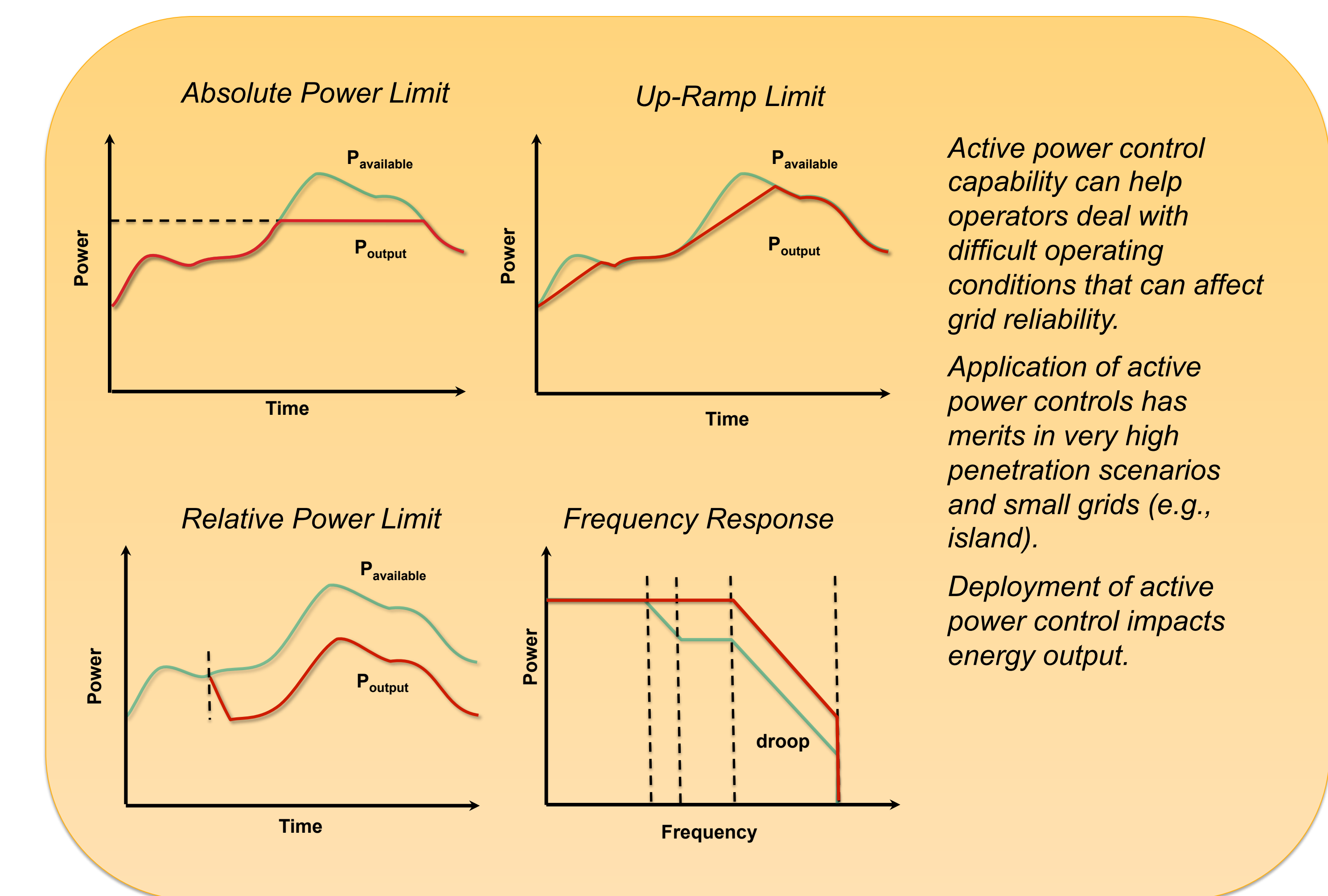
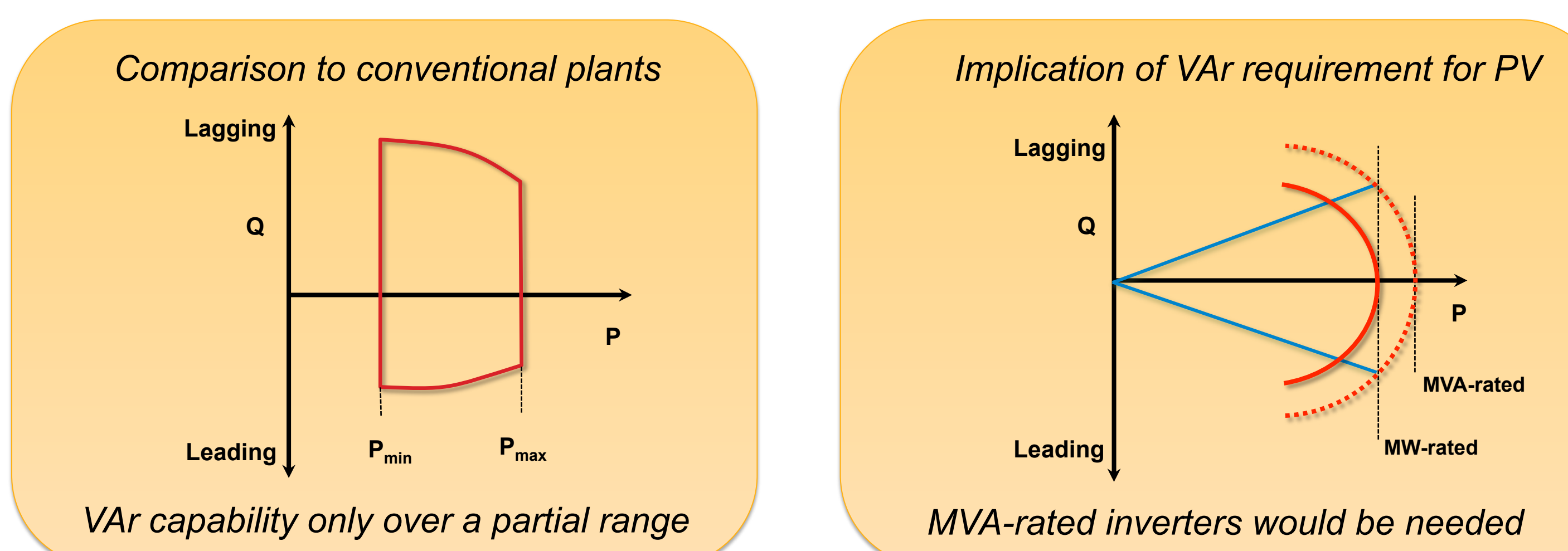
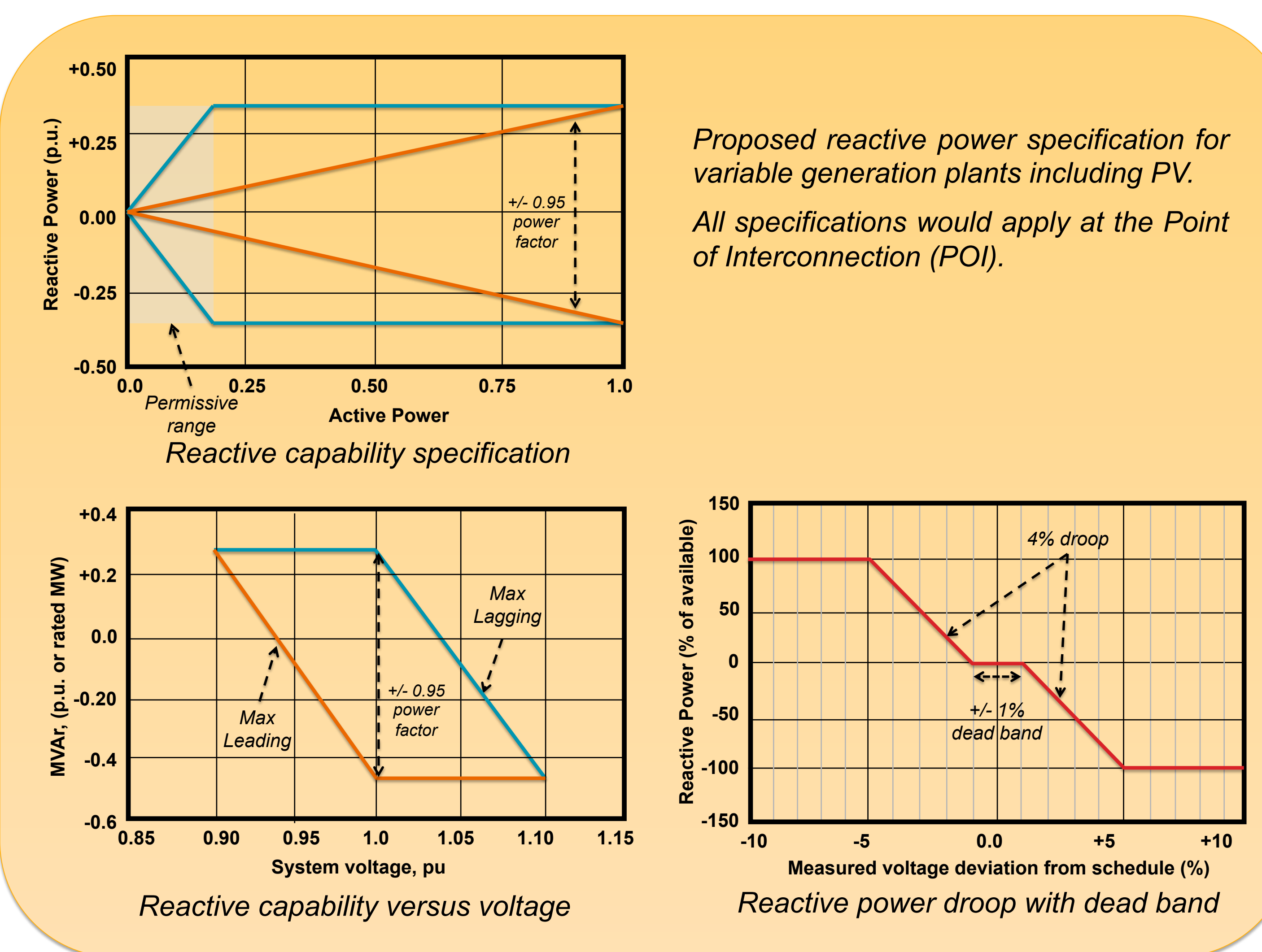
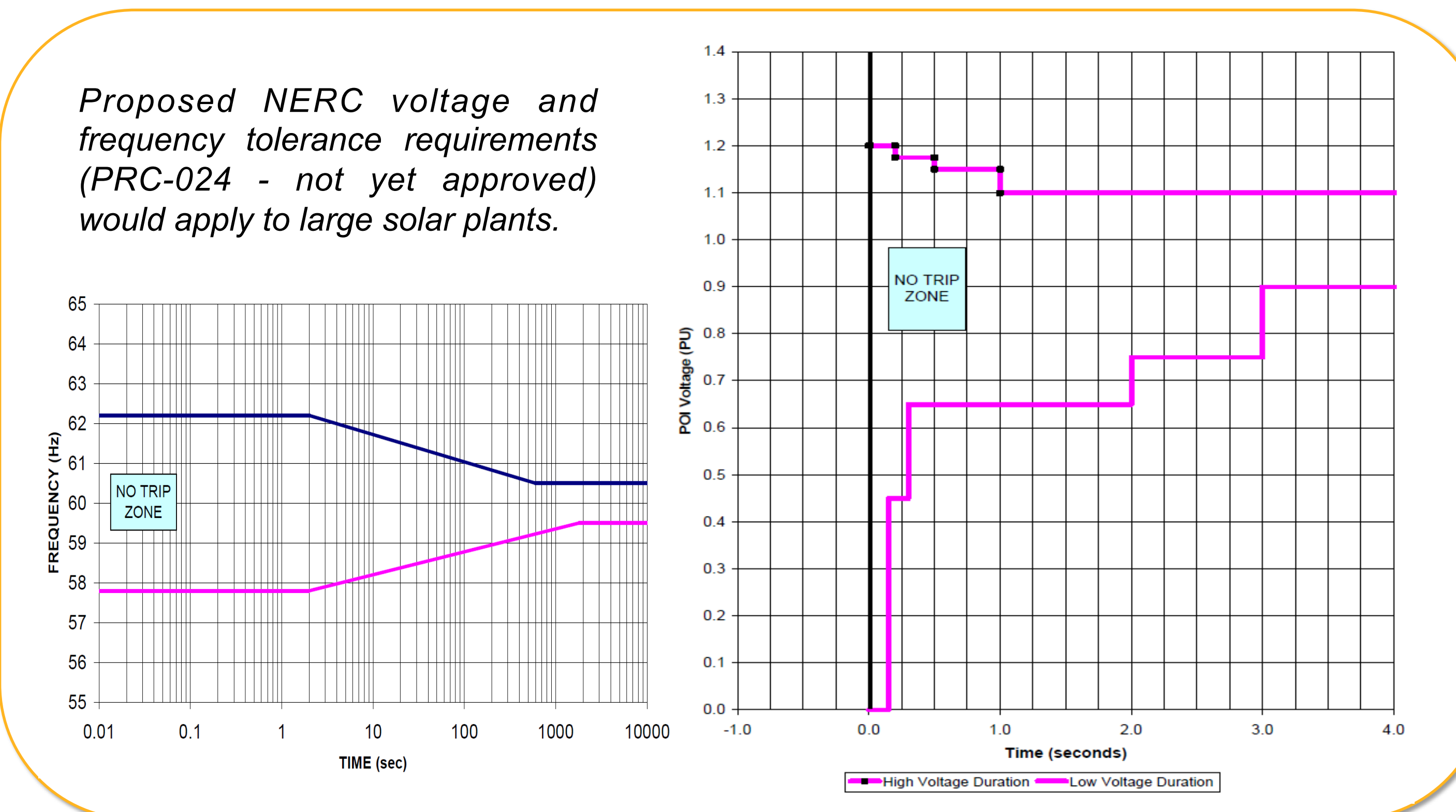
- ❖ Ensure integrity of the grid in high penetration solar scenarios
- ❖ Clarify equipment and controls design requirements
- ❖ Facilitate grid and market access

NERC IVGTF FOCUS AREAS

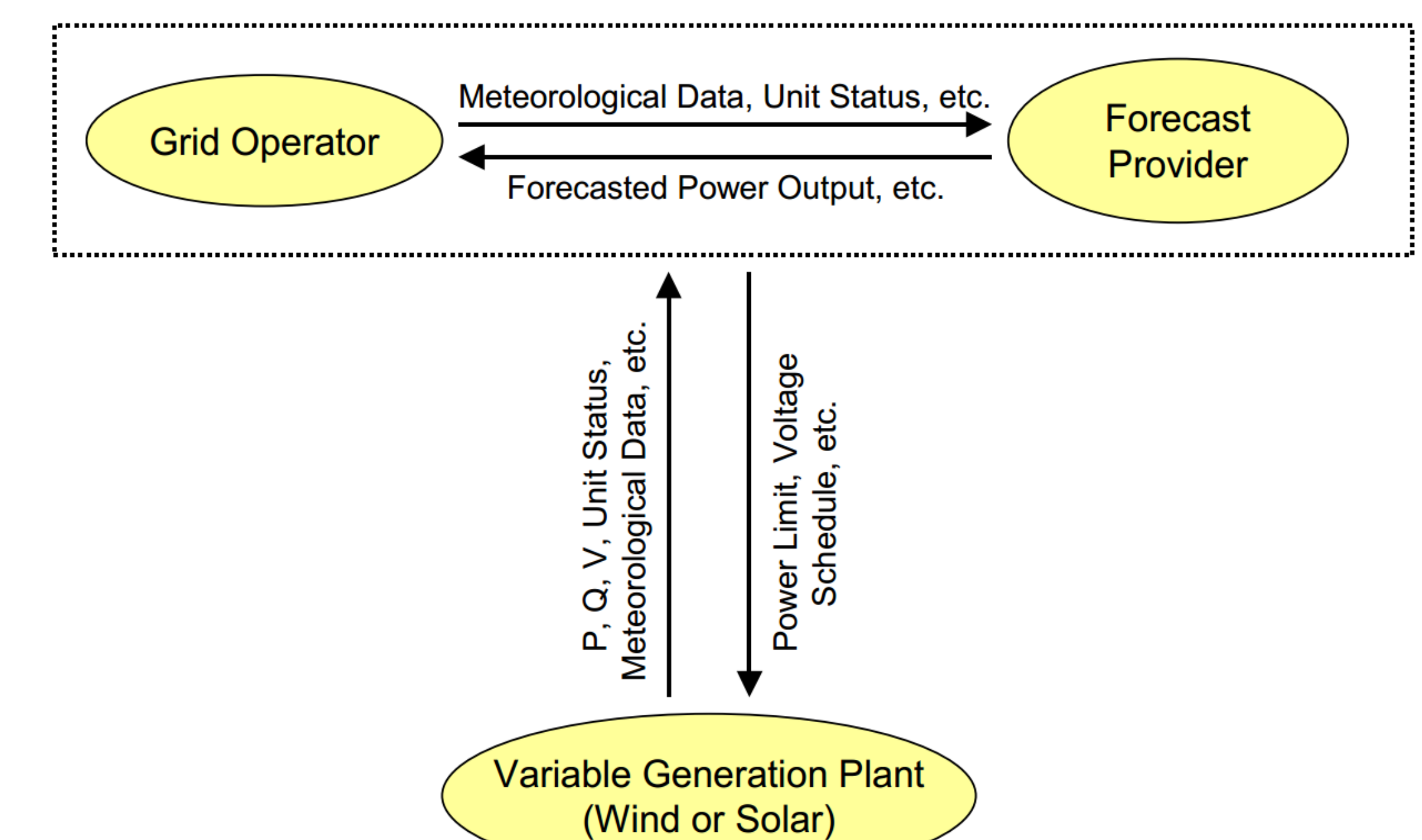
IVGTF Tasks

- 1.1 – Models and data for regional planning
- 1.2 – Variable generation in adequacy planning (capacity value)
- 1.3 – Interconnection procedures and standards**
- 1.4 – Variable generation and resource planning (flexibility considerations)
- 1.5 – Reliability implications of high penetration stationary/mobile storage
- 1.6 – Guidebook on probabilistic planning for system reliability
- 1.7 – Reconciling distribution standards with bulk system standards
- 1.8 – Treatment if distributed resources in bulk system planning and operations
- 2.1 – Variable generation forecasting application
- 2.2 – SCADA integration/interoperability
- 2.3 – BA cooperation to increase flexibility
- 2.4 – Operational practices, procedures, tools.
- 3.1 – Reference Manual

PROPOSED STANDARDS



Communication capabilities for monitoring and controls is needed for reliable operation of large PV plants. NERC Standards also address



OUTLOOK

- ❖ NERC and other stakeholder groups are working to update bulk-level reliability standards to get ready for future high penetration solar (and wind) scenarios.
- ❖ In addition standards related to interconnection, IVGTF is reviewing a wide range of planning and operations practices that may need to be updated.
- ❖ Proposed standards are influenced by international experience and best practices.
- ❖ Sandia is one of many stakeholders providing technical input to NERC IVGTF.